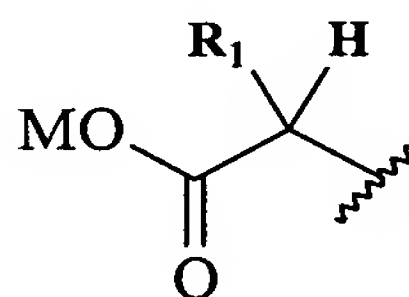


## CLAIMS

1 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble  
 5 monomers characterised in that they have a polymolecularity index of under 2.2  
 determined in aqueous media by a gel permeation chromatographic (GPC) method,  
 having as a standard a series of 5 sodium polyacrylate standards supplied by Polymer  
 Standard Service as references PAA 18K, PAA 8K, PAA 5K, PAA 4K and PAA 3K,  
 and contain at the end of the chain a pattern in accordance with the following formula  
 10 (I):



15

- where  $\text{R}_1$  designates an alkyl radical having 1 to 10 carbon atoms, an aromatic radical possibly substituted by an alkyl chain having 1 to 4 carbon atoms;
- and where M designates the hydrogen atom, an amine salt, ammonium or an alkaline cation.

20

2 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 1, characterised in that the amines are chosen from among the aliphatic and/or cyclic primary, secondary or tertiary amines such as, for example, stearylamine, the ethanolamines (mono-, di-, triethanolamine), mono and  
 25 diethylamine, cyclohexylamine, methylcyclohexylamine, amino methyl propanol and morpholine.

3 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 1, characterised in that the alkaline cations are chosen  
 30 from among sodium, potassium and lithium.

4 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to one of the claims 1 to 3, characterised in that  $R_1$  is an alkyl radical having 2 to 6 carbon atoms, and M designates the hydrogen atom, sodium or potassium.

5

5 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 4, characterised in that  $R_1$  is an alkyl radical having 2 to 6 carbon atoms, and M designates the hydrogen atom or sodium.

10

6 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 5, characterised in that  $R_1$  is an alkyl radical having 2 to 4 carbon atoms, and M designates the hydrogen atom or sodium.

15

7 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 6, characterised in that  $R_1$  is the alkyl radical having 4 carbon atoms, and M designates the hydrogen atom or sodium.

20

8 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 7, characterised in that  $R_1$  is the alkyl radical having 4 carbon atoms, and M designates sodium.

25

9 – Copolymers of acrylic acid with hydrosoluble monomers according to one of claims 1 to 8, characterised in that the hydrosoluble monomers are chosen from among methacrylic acid, itaconic acid, maleic acid, 2-acrylamido-2-methyl-1-propane sulphonic acid in acid form, or partially neutralised, 2-methacrylamido-2-methyl-1-propane sulphonic acid in acid form or partially neutralised, 3-methacrylamido-2-hydroxy-1-propane sulphonic acid in acid form or partially neutralised, allylsulphonic acid, methallylsulphonic acid, allyloxybenzene sulphonic acid, methallyloxybenzene sulphonic acid, 2-hydroxy-3-(2-propenyloxy)propane sulphonic acid, 2-methyl-2-propene-1-sulphonic acid, ethylene sulphonic acid, propene sulphonic acid, styrene sulphonic acid, and all their salts, vinyl sulphonic acid, sodium methallylsulfonate, sulfopropyl acrylate or methacrylate, sulfomethylacrylamide, sulfomethylmethacrylamide or from among acrylamide, methylacrylamide, n-methylolacrylamide, n-acryloylmorpholine, ethylene glycol methacrylate, ethylene

30

glycol acrylate, propylene glycol methacrylate, propylene glycol acrylate, methoxy polyethylene glycol acrylate, methoxy polyethylene glycol methacrylate, propene phosphonic acid, phosphate of acrylate or methacrylate of ethylene or propylene glycol or from among vinylpyrrolidone, methacrylamido propyl trimethyl ammonium chloride or sulphate, methacrylate of trimethyl ammonium ethyl chloride or sulphate, as well as their counterparts in acrylate and in acrylamide, whether or not quaternised, and/or ammonium dimethyldiallylchloride, and mixtures thereof.

10 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to one of the claims 1 to 9, characterised in that they have an average molecular mass by weight ( $M_w$ ) of between 1000 g/mole and 100,000 g/mole, and preferentially between 1000 g/mole and 50,000 g/mole, and very preferentially between 1000 g/mole and 30,000 g/mole, and in an extremely preferential manner between 1000 g/mole and 20,000 g/mole, determined in aqueous media by a gel permeation chromatographic (GPC) method having as a standard a series of 5 standards of sodium polyacrylate supplied by Polymer Standard Service as references PAA 18K, PAA 8K, PAA 5K, PAA 4K and PAA 3K.

11 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to one of the claims 1 to 10, characterised in that they have a conversion rate of over 90%, preferentially over 95%, and very preferentially over 99%, determined by high performance liquid chromatography (HPLC), in which the constituent components of the mixture are separated by a stationary phase, and detected by a UV detector; after calibration of the detector, the area of the peak corresponding to the acrylic compound enables the quantity of residual acrylic acid to be obtained.

12 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to one of the claims 1 to 11, characterised in that they are either in their acid form, i.e. non-neutralised, or partially or totally neutralised by one or more monovalent, divalent or trivalent neutralisation agents, or neutralisation agents with higher valencies, or mixtures thereof.

13 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 12, characterised in that the monovalent neutralisation agents are chosen from the group constituted by the compounds containing alkaline cations, in particular sodium and potassium, or again lithium, ammonium, or from the aliphatic and/or cyclic primary or secondary amines such as the ethanolamines, mono and diethylamine, or again cyclohexylamine.

14 – Homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 12, characterised in that the divalent or trivalent neutralisation agents, or neutralisation agents with higher valency, are chosen from the group constituted by the compounds containing divalent cations belonging to the alkaline earths, particularly magnesium and calcium, or again zinc, and also by the trivalent cations, particularly aluminium, or again by compounds containing cations with a higher valency.

15

15 – Use as agents to aid grinding and/or co-grinding of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers, according to one of the claims 1 to 14.

16 – Use as agents to aid grinding and/or co-grinding of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 15, characterised in that the mineral matter is chosen from among natural or synthetic calcium carbonate, the dolomites, kaolin, talc, gypsum, titanium oxide, satin white or again aluminium trihydroxide, mica and mixtures of at least two of these fillers, such as talc-calcium carbonate mixtures, calcium carbonate-kaolin mixtures or mixtures of calcium carbonate with aluminium trihydroxide, or again mixtures with synthetic or natural fibres or again mineral co-structures such as talc-calcium carbonate or talc-titanium dioxide co-structures.

17 – Use as agents to aid grinding and/or co-grinding of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 16, characterised in that the mineral matter is a calcium carbonate chosen from among marble, calcite, chalk, or mixtures thereof.

18 – Use as agents to aid grinding and/or co-grinding of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to one of the claims 15 to 17, characterised in that 0.05% to 5% by dry weight of the polymers according to the invention is used, relative to the dry weight of mineral matter.

19 – Use as agents to aid grinding and/or co-grinding of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 18, characterised in that 0.1% to 3% by dry weight of the polymers according to the invention is used, relative to the dry weight of mineral matter.

20 – Use as dispersing agents of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers, according to one of the claims 1 to 14.

21 – Use as dispersing agents of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 20, characterised in that the mineral matter is chosen from among natural or synthetic calcium carbonate, the dolomites, kaolin, talc, gypsum, satin white or again aluminium trihydroxide, mica and mixtures of at least two of these fillers, such as talc-calcium carbonate mixtures, calcium carbonate-kaolin mixtures or mixtures of calcium carbonate with aluminium trihydroxide, or again mixtures with synthetic or natural fibres or again mineral co-structures such as talc-calcium carbonate or talc-titanium dioxide co-structures.

22 – Use as dispersing agents of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 21, characterised in that the mineral matter is a calcium carbonate chosen from among marble, calcite, chalk, or mixtures thereof.

23 – Use as dispersing agents of mineral matter, of homopolymers of acrylic acid and/or copolymers of acrylic acid with hydrosoluble monomers according to one of the



claims 20 to 22, characterised in that 0.05% to 5% by dry weight of the polymers according to the invention is used, relative to the dry weight of mineral matter.

24 – Use as dispersing agents of mineral matter, of homopolymers of acrylic acid  
5 and/or copolymers of acrylic acid with hydrosoluble monomers according to claim 23, characterised in that 0.1% to 3% by dry weight of the polymers according to the invention is used, relative to the dry weight of mineral matter.

25 – Aqueous suspensions of mineral matter, ground and/or co-ground through the use  
10 as grinding and/or co-grinding aid agents of the polymers according to one of the claims 15 to 19, characterised in that the mineral matter is chosen from among natural or synthetic calcium carbonate, the dolomites, kaolin, talc, gypsum, titanium oxide, satin white or aluminium trihydroxide, mica and mixtures of at least two of these fillers, such as talc-calcium carbonate mixtures, calcium carbonate-kaolin mixtures or  
15 mixtures of calcium carbonate with aluminium trihydroxide, or again mixtures with synthetic or natural fibres or again mineral co-structures such as talc-calcium carbonate or talc-titanium dioxide co-structures.

26 – Aqueous suspensions of mineral matter ground and/or co-ground through the use  
20 as a grinding aid and/or co-grinding aid agent of the polymers according to claim 25, characterised in that the mineral matter is a calcium carbonate chosen from among marble, calcite, chalk, or mixtures thereof.

27 – Aqueous suspensions of mineral matter ground and/or co-ground through the use  
25 as a grinding aid and/or co-grinding aid agent of the polymers according to one of the claims 25 or 26, characterised in that 0.05% to 5% by dry weight of the polymers is used, relative to the dry weight of the mineral matter.

28 – Aqueous suspensions of mineral matter ground and/or co-ground through the use  
30 as a grinding aid and/or co-grinding aid agent of the polymers according to claim 27, characterised in that 0.1% to 3% by dry weight of the polymers according to the invention is used, relative to the dry weight of the mineral matter.

- 29 – Aqueous dispersions of mineral matter obtained through the use of the polymers as a dispersant agent according to one of the claims 20 to 24, characterised in that the mineral matter is chosen from among natural or synthetic calcium carbonate, the dolomites, kaolin, talc, gypsum, satin white or aluminium trihydroxide, mica and mixtures of at least two of these fillers, such as talc-calcium carbonate mixtures, calcium carbonate-kaolin mixtures or mixtures of calcium carbonate with aluminium trihydroxide, or again mixtures with synthetic or natural fibres or again mineral co-structures such as talc-calcium carbonate or talc-titanium dioxide co-structures.
- 30 – Aqueous dispersions of mineral matter obtained through the use of the polymers as a dispersant agent according to claim 29, characterised in that the mineral matter is a calcium carbonate chosen from among marble, calcite, chalk or mixtures thereof.
- 31 – Aqueous dispersions of mineral matter obtained through the use of the polymers as a dispersant agent according to one of the claims 29 or 30, characterised in that 0.05% to 5% by dry weight of the polymers is used, relative to the dry weight of mineral matter.
- 32 – Aqueous dispersions of mineral matter obtained through the use of the polymers as a dispersant agent according to claim 31, characterised in that 0.1% to 3% by dry weight of the polymers according to the invention is used, relative to the dry weight of mineral matter.
- 33 – Use of aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in paper formulations, such as in the formulation of paper coating colours and mass filling.
- 34 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in paint formulations.
- 35 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in plastic formulations.

36 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in cement formulations.

5 37 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in ceramic formulations.

38 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in detergent formulations.

10 39 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in formulations for the treatment of water.

40 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in drilling muds.

15

41 – Use of the aqueous suspensions and dispersions of mineral matter according to one of the claims 25 to 32, in cosmetic formulations.

20 42 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in paper formulations, such as the formulation of coating colours and mass fillings.

25 43 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in paint formulations.

30 44 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in cement formulations.

45 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in ceramic formulations.



46 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in formulations for the treatment of water.

47 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in detergent formulations.

48 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in drilling muds.

49 – Direct use as a dispersant agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14, in cosmetic formulations.

50 – Direct use as a scale inhibitor agent of homopolymers of acrylic acid and/or copolymers of acrylic acid with other water-soluble monomers according to one of the claims 25 to 38, in formulations for the treatment of water.

51 – Paper formulations, such as coating colours and mass filling formulations, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers according to one of the claims 1 to 14.

52 – Paint formulations, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.

53 – Plastic formulations, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.

- 54 – Cement formulations, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.
- 5    55 – Ceramic formulations, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.
- 10    56 – Formulations for the treatment of water, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.
- 15    57 – Detergent formulations, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.
- 58 – Drilling muds, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.
- 20    59 – Cosmetic formulations, containing homopolymers of acrylic acid and/or copolymers of acrylic acid with other hydrosoluble monomers, according to one of the claims 1 to 14.